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1. Its velocity will vary inversely as the sine of the perpendicular arc let fall from s on the great circle which is a tangent at P to the trajectory described by the point.

2. The force in the direction of the arc sp is equal to $\frac{v^2}{\tan \gamma \sin \theta}$, v being the velocity of the point, γ the radius of the osculating circle, and θ the angle between sp and the tangent arc.

The proposition may be readily proved by means of these principles, taken in conjunction with the following property of spherical conics :

A tangent arc being drawn at any point on a spherical conic, if a perpendicular be let fall upon it from a fixed point, and if a second perpendicular be let fall from the point of contact on the polar of the fixed point, the quotient of the sines of these two perpendiculars will always be proportional to the tangent of the normal arc at the point of contact.

This very general theorem is its own polar reciprocal.

Mr. J. J. A. Worsäae, of Copenhagen, being requested to give an account of the formation of the Museum of Antiquities in that city, made a communication to the following effect :

“ It is a very well known fact, that but few countries in the north of Europe escaped invasion or conquest by the Romans. Among those few, however, Ireland and Denmark are specially to be named ; and on that account it is certainly more than a mere accident that these two countries are in possession of some of the best collections of national antiquities in Europe. I have had the opportunity of repeatedly inspecting the very interesting collection of the Academy, and it has been told me, that the comparatively large number of Irish antiquities there assembled has been brought together in a short time, but under circumstances of considerable difficulty. Our collection of national antiquities in Denmark has likewise been founded under great disadvantages ; and perhaps it

will not be without interest to the Academy, if only in that respect, to get a short history of its foundation, progress, and present state.

“ About forty years ago, the general character of scientific pursuits was, in our country, much the same as in most other parts of Europe : great pains were spent in collecting all sorts of objects illustrating the changes of the globe upon which we live, and the distribution and habits of animals and plants, in short, all the departments of natural history ; whilst, strange to say, people for the most part neglected *traces of men*, the remains, not only of their own ancestors, but also of all the different races who have been spread over the world. The antiquities, with the exception of those of Roman and Greek origin, were regarded as mere curiosities, without any scientific value ; and they were generally found in collections mixed up with petrifications and other objects, with which they had little or no connexion. It was not until after the French Revolution, that the value of ethnology, as a most important branch of science, was seen in its proper light. With a greater respect for the political rights *of the people*, there awakened in the nations themselves a deeper interest in their own history, language, and nationality. Since that time there have been formed antiquarian societies, and collections of national antiquities, in most European countries ; in Germany alone there exist at present more than eighty societies, formed for the preservation and collection of national antiquities, which, as I hope, is sufficient to show that an earnest effort is now being made to do what undoubtedly has been too long neglected.

“ Denmark was one of the first countries in which a collection of national antiquities was founded, and no wonder, because the olden time was that in which Denmark, together with the two other Scandinavian countries, Norway and Sweden, was in its greatest power. I shall only recall to your memory, that the weapons of the Scandinavian warriors had

at that time conquered the coasts of the Baltic, a great part of the British islands, of France, and some parts of Spain and Italy ; that, crossing the Atlantic so early as in the ninth and tenth century, they colonized Iceland and Greenland, and put their foot upon the mainland of America. It was immediately after great national calamities, that the attention of the Danish people was turned to that early period of their history, as a time from the contemplation of which their spirit of nationality might gain support, and in whose memories they found the hope of a new and equally glorious era again. The North, too, has this great advantage, that a complete picture of the life of the old time has been preserved in the remarkable Icelandic sagas, which, certainly, compared with other literary remains of that time, in regard to style and representation of character, are almost unique. In the year 1807, the Danish government, in compliance with the request of several literary men, appointed a Royal Committee for the Preservation and Collection of National Antiquities, but the unfortunate war with England hindered the Committee, for the first seven or eight years, from making much progress. After the restoration of peace, it happened that a young man, a merchant's son in Copenhagen, who, from his earliest childhood, had felt a great interest in all sorts of antiquities, was appointed Secretary of this Royal Committee. He found a few antiquities, mixed up with the most curious things, in a small room in the library of the University. He commenced with exceedingly small grants, and under very great difficulties. He had not only to contend with the prejudices of the unlearned, but also with the conflicting opinions and baseless theories of the learned men. Some believed that the antiquities of iron were the oldest, because they were most corroded ; others believed that the antiquities of brass were older than the antiquities of stone ; others, again, supposed, that the wealthy men had used iron, the middle classes brass, and the poor stone. However, he opened his small collection for public

inspection; was always present on the public days for the purpose of showing and explaining the antiquities; and when peasants happened to visit the collection, he paid particular attention to them, 'because,' as he said, 'it is by them we shall have our collection enlarged.' For many years he continued to show the collection, and to diffuse an interest in the old remains throughout the country, and all this without receiving any pecuniary emolument, I ought rather to say, at very considerable expense to himself. At last, the collection became so large, that the room in the library was far from furnishing sufficient accommodation; and the constantly increasing interest in the collection, and fresh donations of antiquities, made its removal necessary. After many difficulties, he made a great step in advance, by getting rooms in the royal palace, 'Christiansborg,' in Copenhagen. He then fully carried out his idea of arranging the Pagan antiquities into three periods, the *stone, brass, and iron periods*, which he was the first to point out to antiquaries. It was not long before the collection acquired a great name on the Continent; all foreigners spoke about it as one of the most remarkable collections in the north of Europe. The Government evinced more and more interest in the Museum, and the public began to regard it as a national treasure. In the mean time, the Royal Society of Northern Antiquaries in Copenhagen had published many of the remarkable Icelandic sagas, through which the people got more knowledge of the importance of the olden time, than they had hitherto possessed. The Society published in its Annals descriptions of the antiquities of the Museum, and published separately popular tracts, illustrated with woodcuts, on the value and importance of preserving the antiquities, many thousands copies of which were spread over the country, among clergymen, schoolmasters, and peasants. From all sides and all parts of the country antiquities were presented to the Museum; and it has now been enlarged to such an extent, that when the new arrangement, which is now going on, is finished, it will occupy about ten

rooms of the royal palace. His Majesty the present King of Denmark, whose great zeal for the promotion of literature and science is well known, and His Royal Highness the Crown Prince, are both most anxious to make this collection still larger and more important. The real founder of the Museum, about whom I spoke above, the present Councillor of State, *C. J. Thomsen*, has had the gratification of seeing his extraordinarily energetic efforts crowned with the most signal success. In order to give some idea of the extent of the Museum, I shall only mention, that it contains more than three thousand specimens of implements of stone; a very large room is filled with antiquities of brass, among which are complete shields, and several large trumpets of war, between two and three hundred complete swords and daggers of brass, several hundred celts and brass hatchets, lance-heads, ornaments, &c. As many specimens as possible, even of the most common things, are collected, because true historical results can be deduced only from a long series, showing that the various articles were in common use. Among the antiquities of the bronze and iron periods are to be seen a great number of rings, and other ornaments of silver and gold, I should say a larger number than I have found in any other collection. It was formerly a law in our country, that all antiquities of silver and gold, which were found in the earth, must be surrendered to the Crown, without any recompense to the finder, the effect of which was, that most of those things were melted and made away with. The King, therefore, ordered, that the finders of antiquities of silver and gold should receive the full value of the articles, when they sent them into the Royal Collection; and that they should get more than the real value when the specimens were uncommonly rare, or when particular pains had been taken to find or preserve them. I am happy to say, that the Museum now gets very nearly all the antiquities of silver and gold which are found in our country, particularly as they are paid for by the Government out of a peculiar fund.

“ I have thought that it would not be without interest to the Academy, to see how a large collection has been formed, in about thirty years, by energetic exertions, continued in spite of great difficulties ; and how the collection, after those difficulties have been overcome, now stands as a national monument, supported alike by the Government and by the people. I doubt not that the Collection of this Academy, which in a few years has attained such magnitude, will, if carried on with the same energy, be soon of so much importance, and gain so great a name in Europe, that it will receive that strong support, both from the Government and the inhabitants of Ireland, which it at present wants.

“ If you will allow me I shall, at another meeting, institute a short comparison between the antiquities in the Irish and Danish collections. It is only through such a comparison of the antiquities in different countries, that a new light will be thrown over the many dark periods of the early history of Europe ; and I hope that the connexion, which in ancient times existed between Ireland and Scandinavia, will give me a peculiar advantage in illustrating the origin and use of some antiquities in the collection of the Academy.”

Rev. Samuel Butcher read a paper by Rev. Dr. Hincks, in continuation of his researches in the Persepolitan writing.

In this paper Dr. Hincks shows, that the general principles respecting the Persian writing, which he had laid down in his former communication on this subject,* are borne out by the Bisitun inscriptions, recently published by Major Rawlinson. The values which, in his former paper, Dr. Hincks had assigned to four of the characters, he admits to be erroneous, and, accordingly, now corrects them ; but maintains that the values assigned by him to the remaining characters are the true ones, and adduces the new inscriptions in proof thereof. With re-

* “ On the first and second kinds of Persepolitan writing,” by the Rev. E. Hincks, D. D. (*Vid. Proceedings*, vol. iii. p. 262).